

Food Availability and Poverty in Boston

Introduction:

Food deserts are areas with limited access to affordable and nutritious food. The Massachusetts Public Health Association has found that nearly 40% of Massachusetts residents live in areas with limited grocery access. For my project, I proposed a neighborhood by neighborhood analysis of food availability in Boston, and how food availability compares to poverty levels in each of Boston's neighborhoods.

Data Sets:

To understand this issue, I began by collecting data on the location of each grocery store in Boston by using the Google Places API. However, by querying 'Grocery store Boston' with the Google Places API, I could not be sure that its search had actually included all grocery stores in Boston, and it certainly did not include the locations of farmer's markets and other ways to access healthy, fresh food. To ameliorate this issue, I also collected data of Active Boston Food Establishment Licenses from Analyze Boston. However, this data set did not end up being used in any of my final results or visualizations.

I also collected GeoJSON data for each Boston neighborhood from Analyze Boston, and I combined this data set with Boston Neighborhood Poverty Data from Yash's group, to get a better sense of income disparities between neighborhoods in Boston.

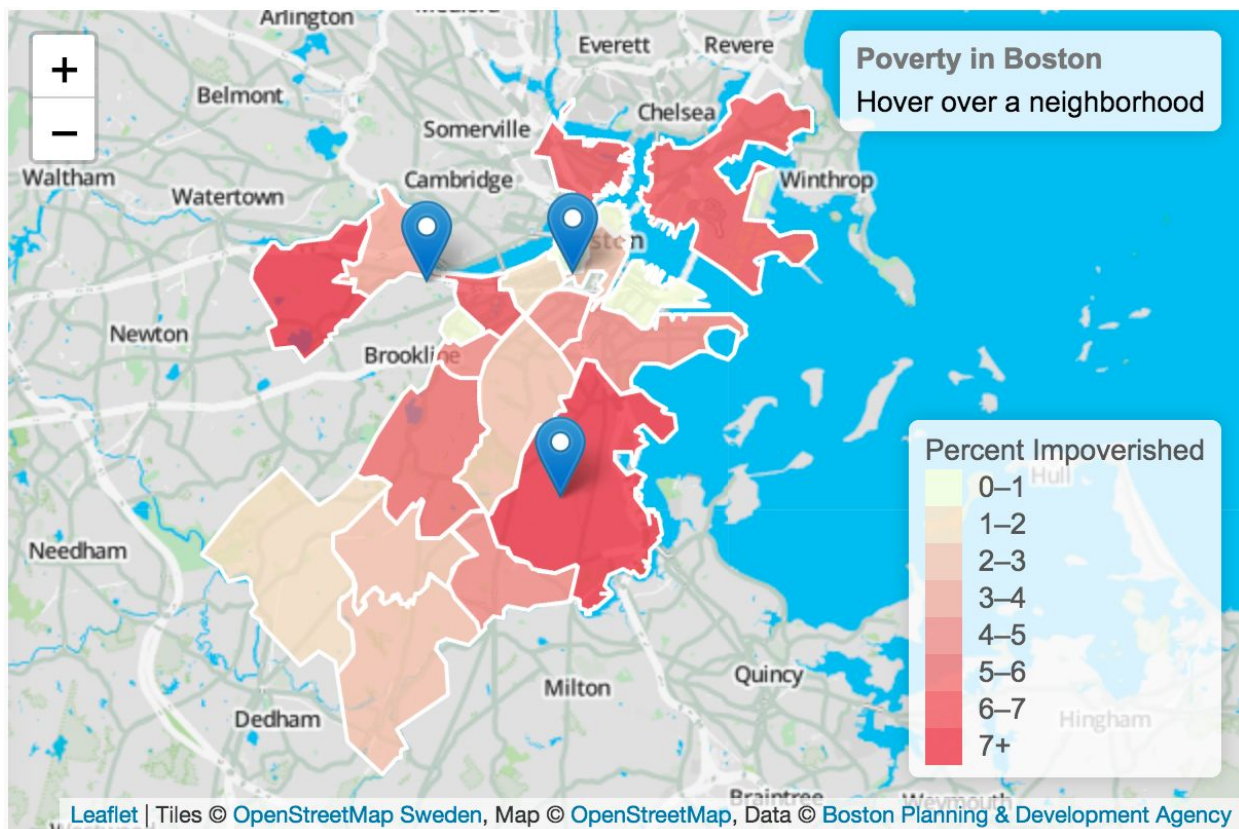
I also hoped to get an even finer-grain look at income disparity in Boston by averaging the employee incomes from the Employee Earnings report on Analyze Boston by zip code. However, after viewing the results of this manipulation, I found the data was not as relevant as I had hoped, and the small sample size of only Boston government-salaried employees did not seem like it would accurately represent the entire Boston population.

Methods:

I chose to use k-means to identify where grocery stores are clustered within Boston, and to better understand what grocery stores are closest to all other grocery stores. Identifying these

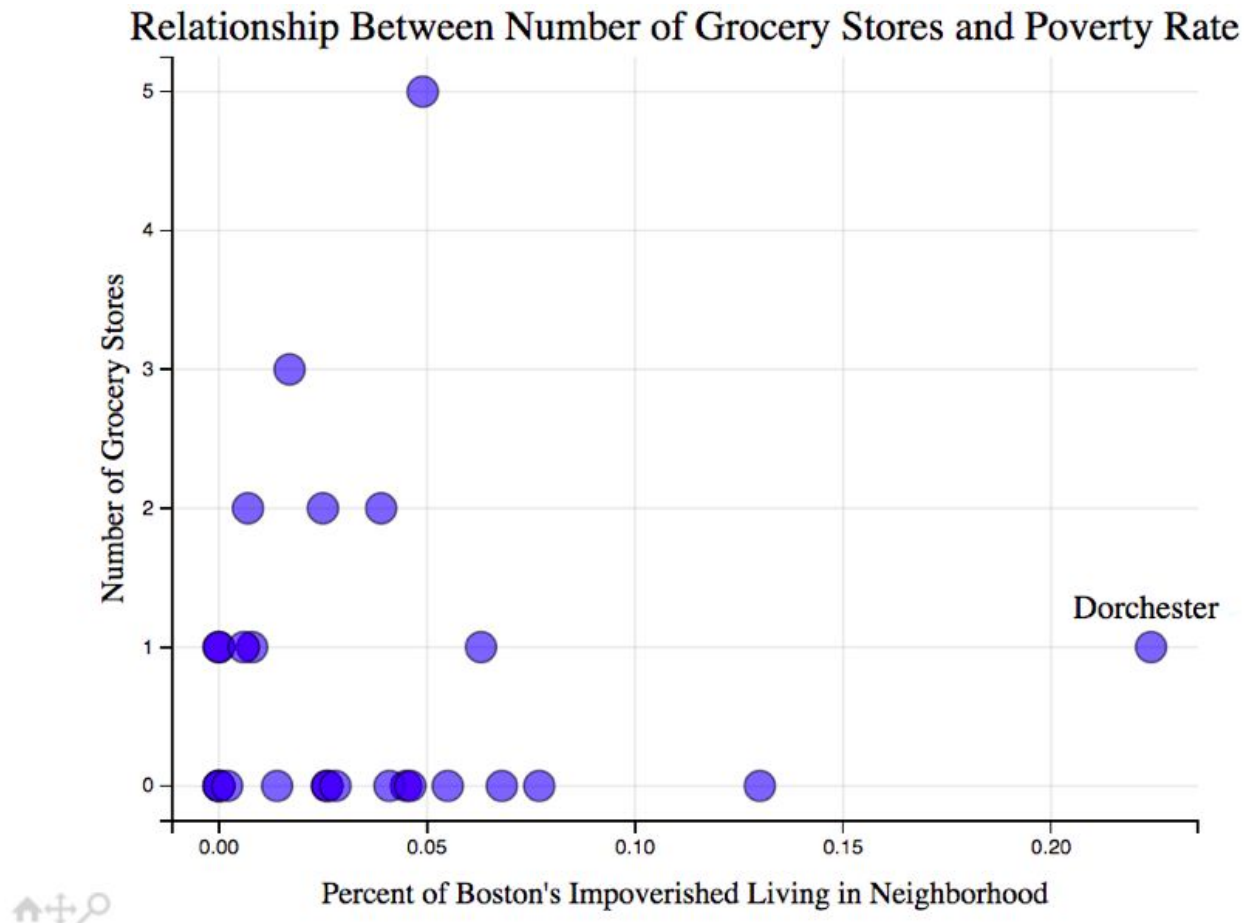
clusters of grocery stores allows us to identify areas where the Boston community has easy access to healthy and fresh food options.

I compared the number of grocery stores in each Boston neighborhood with the percentage of Boston's impoverished living in that neighborhood, in order to better understand if there was any correlation between low-income neighborhoods and a dearth of grocery stores in that area. I found a positive correlation coefficient, indicating a positive linear relationship between the number of grocery stores and the percent of Boston's impoverished living in a given neighborhood. However, this relationship could simply be because neighborhoods with greater populations will have a greater percent of Boston's impoverished and more grocery stores. Additionally, the p-value was around 0.005.



My second visualization is a scatter plot created with D3 that shows the relationship between the number of grocery stores by neighborhood and the percent of Boston's impoverished living in each neighborhood. These two variables are represented on the y and x axes of the scatter plot, and by mousing over each data point, the name of the neighborhood

that each point represents appears. Utilizing D3 for this graph was important, because many neighborhoods appear clustered together in the graph with a few far outliers, and D3's ability to zoom and pan across graphs allows for a deeper exploration of these results.



Results:

While these results are interesting, they provide little clarity in examining the relationship between food availability and poverty in Boston. Additionally, with the results of my project it is clear that I did not actually identify the location of any specific food deserts in Boston, but instead only the areas where there is easy access to a high number of grocery stores. The fact that this project only contains data from neighborhoods within Boston, and excludes areas like Cambridge, Chelsea, and Brookline is problematic, and could skew results, especially the centroids identifying grocery stores. There are still many unanswered questions that can only be answered with more food-related data and more in-depth statistical analysis.

Future Work:

Simply locating grocery stores geographically does not fully indicate which areas in Boston are food deserts. Future work on this project could include identifying grocery stores that are most and least accessible by public transportation and comparing average food prices across different grocery store chains to understand which chains are most accessible to low-income residents. Additionally, future work would need to take other sources of healthy food, like seasonal farmers markets, into consideration. Ideally, future research could uncover food deserts and provide recommendations for areas to incorporate new grocery stores into the communities that need them.